Available online at www.abhipublications.org
Review Article
International Journal of Pharmacy and Engineering (IJPE)
ISSN 2320-849X

PHARMACOLOGICAL AND TRADITIONAL USES OF *PAEDERIA FOETIDA LINN*: A REVIEW

Nigam jyoti Maiti[1*],Tusar Ranjan Mohapatra[1],Bijay Kumar Sahoo[1],Nikhat Parwen[1]

[1] IMT Pharmacy College, Gopalpur, Puri

ABSTRACT:

Paederia foetida is an indigenous plant belongsto family Rubiaceae. The plant is having a broad spectrum of use as in treatment of hepatic disorders, rheumatoid arthritis, constipation, diabetes, coughs, asthma, itches, wounds, stomach ache, diarrhoea, dysentery, pain, typhoid, pneumonia, toothache, cancer, flatulency, body ache, and bone fractures etc. The presence of asperuloside, paederosidic acid, phenolic compounds, alkaloid, volatile oil, sitosterols, stigmasterol, campesterol, ellagic acid, lignans, iridoids, methylinedioxy compound, tannins, triterpenoids, urosil acid, epifriedelinol in plant and found to have anti-ulcer, anti-diarrhoeal, anti-hyperglycemic, antioxidant, antitussive, anthelmintic, hepatoprotective activity. This review target at gathering the research work undertaken till date for future works on this plant.

Key Words: *Paederia foetida, Antioxidant,* Anti-hyperglycemic, Anti-ulcer, Anti-diarrhoeal,

Received: November 12th , 2018, Revised: November 15th , 2018, Accepted: November 17th , 2018,

Corresponding Author: ***Nigam Jyoti Maiti***
IMT Pharmacy College, Gopalpur, Puri. E mail ID: nigammaiti007@gmail.com

INTRODUCTION:

Ancient literature incorporates a remarkable broad definition of medicinal plants and considers all parts of the plant to be potential source of medicinal substances. So it becomes extremely important to make an effort towards standardization of the plant material to be used as medicine [1-3]. The genus *Paederia* contains 20- 30 species in worldwide generally distributed in Asia, commonly known as skunk vine like shrub, perennial climbing herb, in India it found in Himalayas from Dehradun east wards up to an altitude of 1800 meter and also in Assam, Bihar, Bengal, Orissa and Andhra Pradesh.*Paederia fotida* Linn, a member of Rubiacae isan extensive climber: glabrous or puberulous . The local name is

"*JyrmiSmaiwtung*" . It is known as Chinese Flower in English, Gandhaprasarini in Hindi, Prasarani in Sanskrit .*Paederiafoetida*is native to both temperate andtropical Asia, from India to Japan and South East Asia. It contains bitter taste with having foul smell. *P. foetida* may grow high in to the trees in a variety of habitats from msichammocks to xeric sand hill communities, although it appears to prefer sunny flood plains and bottom lands even grow under water, tree gaps and other disturbed areas[4-5] .

Pharmacognosy and Morphological Characters:

*Paederiafoetida*isan extensive, foetid climber. Leaves opposite, ovate or lanceolate, acute or cuspidate, 2.5-3.8 cm long. Surface is glabrous and mostly ovate, green in colour having a characteristic odour indistinct bitter taste. Epidermal trichomes are sparsely seen both on the upper and lower epidermis. Mesophyll composed of single layered palisade cells and 3-4 layered spongy tissue; in margin of the leaf mesophyll replaced by thick walled cells. Trichomes are present on both surfaces elongate to produce uniseriatetrichomes. Midribs composed of single layered epidermis covered with cuticle; ground tissue consisting of 2-5 layered of collenchyma towards upper and lower side and rest parenchyma; a large median crescent-shaped vascular bundle consisting usual elements with xylem towards upper side and phloem towards lower side .The inflorescence consists of a terminal or axillary cymose panicle that is extremely variable. It grows from widely branched paniculate over 1m long to rather reduced size, normally 10cm long. The bracts are either leaf-like or small and linear, with few to numerous flowers, often in lax coiled cymes with peduncle that is 2-30mm long . The flowers are bisexual, usually 5-merous; in dirty pink or lilac or purplish colour . The corolla lobes are pinkish to whitish on the inside while the throat is dark purple. The sepal is bell-shaped, with 5 normally smooth triangular-lobed with sizes up to 1mm x 0.6mm.The petal is cylindrical to bell-shaped, and sizes 5-17mm x 2-5mm. The throat and the inside of the long tube are densely hairy with 5 oblong to triangular lobes and sizes between 1-3mm x 1.5-3mm. The margins are wavy and flexed. It has 5 stamens that are inserted in the middle of the tube which includes 2-2.5mm long anthers. The 2-celled and 2 ovuled ovary is inferior with a small disk and 4-15mm long style.The stigmas joined the style up to 2mm of its length. The 2 stigma branches are thread-like and irregularly twisted.The sub-spherical fruit is a drupe at 4-6mm in diameter. The fruit walls are thin, dry and brittle. It is crowned by the persistent sepals, shiny pale brown to yellowish-or reddish-brown in color. The seedling is germinated above the ground, with cotyledons broadly rounded. The veins are prominent while the first pair of leaves form is elliptical and apex is acuminate. Fruit orbicular, wings pale, 1.1 cm across .*Paederiafoetida* contains paederolone, paederone, β-sitosterol, paederoside, asperuloside and their related glucosides . The leaves of the plant are also rich in carotene, vitamin C, keto-alcohol and alkaloid .Shreedhara reported to quantify important markers (asperuloside, beta-sitosterol and lupeol) also in leaves .*P. foetida*also contains friedelin, campesterol,ursolic acid, hentriacontane, hentriacontanol, ceryl alcohol, palmitic acid and methyl mercaptan[6-8] .

PHARMACOLOGICAL ACTIVITIES

Hepatoprotective activity: Plant extractexhibits ameliorative effects on hepatotoxin-induced liver damage in the Sprague Dawley rat model[9-10]. We induced *in vivo* oxidative stress in rats by a single intraperitoneal injection of carbon tetrachloride and then administered the plant extract to the rats for three successive weeks.The anti-hepatotoxic potentials of the plant extract against *in vivo* CCl_4-induced hepatic lesions were then evaluated. The administration of the extract significantly decreased the levels of hepatic lipid peroxide (LPO) in the CCl4-intoxicated rat by about 40%. The CCl4-induced increase in the serum enzyme activities such as GPT, GOT, ALP as well as in the bilirubin level were also

significantly reduced. The results of the present study suggest that *Paederiafoetida*can ameliorate toxin-mediatedhepatocellular .

Anthelmintic Activity:

Methanolic extract ofthe leaves of *Paederiafoetida* were screened for its anthelmintic activity against *Pheretimaposthuma*and*Tubifextubifex*. The parameterslike the time of paralysis and the time of death were determined by using the extract at the concentrations of 25, 50 and 100 mg/ml. The extract exhibited significant anthelmintic activity at highest concentration of 100 mg/ml as compared with piperazine citrate (10mg/ml) as standard reference and distilled water as control .

Antihyperglycemic activity:

Antihyper-glycemic activity studies were conducted by oral glucose tolerance tests in glucose-loaded Swiss albino mice with crude methanol extract of stems of *Paederiafoetida*. Methanol extracts of stems of *Paederiafoetida* also exhibited significant and dose-dependent reductions in serum glucose levels when administered to glucose-loaded mice. The extract at the four different doses of 50, 100, 250 and 500 mg/kg body weight, reduced serum glucose levels by 7.7, 25.3, 31.0, and 31.2%, respectively. Overall, the results demonstrate significant antihyperglycemic activities.

Antibacterialactivity:

The test microorganisms included two Gram-positive(*Staphylococcus aureus, Enterococcus faecalis*) and three Gram-negative (*Escherichia coli,Salmonella typhimurium, Shigellaflexneri*)bacteria. The extract showed significant antibacterial activities against *S. flexneri, S.aureus, E. coli* and *E. faecalis*. The preliminaryscreening experiment revealed that the most susceptible bacterium was *S. Flexneri* while the most resistant was *S. typhimurium*. The results of experiment clearly indicate that *Paederiafoetida* plant could be used for its antibacterial activity .

Anti-ulcer activity:

The anti-ulcer screeningwas performed using two methods that is pyloric ligation method and aspirin induced ulcerations in rats. Volume of gastric acid, total acidity and free acidity were also measured to assess the anti-ulcer potential. Therefore expressed that the roots of *P foetida* exerts anti-ulcer activity which may be due to anticipated inhibition of H_2 receptors resulting in inhibition of gastric acidsecretion elicited by histamine and gastrin. The work justifies its use in the traditional system of medicine .

Antinociceptive Activity:

The significantantinociceptive activity of hexane and methanol extract of the whole plant of *P.foetida*might be due to the presence ofanalgesic principles acting with the prostaglandin pathways. Swiss albino mice were using for study. Although the extracts of *P. foetida*exhibited significant analgesicactivity, further study is required to isolate active constituents of this plant. The antinociceptive activity of different extracts of *P. foetida*was determined by the acetic acidinduced writhing inhibition method. The antinociceptive activity of the ethyl acetate extract was not significant in both doses [11-16].

Antioxidant activity:

The antioxidant activityof fresh and dried plant extracts of *Paederiafoetida*was studied using β-carotene bleachingand the 2,2'-azinobis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical cation assay. The percentage of antioxidant activity for all extract samples

using both assays was between 58 and 80%. The fresh samples of both plants had higher antioxidant activity than the dried samples.

Antitussive activity:

The ethanolic extract of*Paederiafoetida*(*P. foetida*) in conscious catsby mechanical stimulation of laryngo-pharyngeal (LP) and tracheobronchial (TB) mucous areas of airways. The oral dose of 200 mg·kg-1 b.w. had a cough-suppressive effect.It caused a significant (p< 0.05) decrease of the number of cough efforts (NE) and frequency of cough (NE.min-1) from both LP and TB areas. The intensity of a cough attack was significantly decreased only during inspirium (IA-). Also a significant (p< 0.05) decrease was observed of the intensity of maximal effort in expirium (IME+) from TB area and inspirium (IME-) from both LP and TB areas. The antitussive activity of the ethanolic extract of *P. foetida* was lower than that of the classical narcotic antitussive drug - codeine, but similar to that of the non-narcotic antitussive agent dropropizine [17-21].

CONCLUSION:

The detailed information presented in this review provides evidence for its various traditional uses. The pharmacological studies that have tested the validity of traditional uses confirmed its anti-inflammatory, antimicrobial and hepato-protectiveactivites etc. support the use of *Paederia foetida* to increase renal functions. Reports of the use of this plant for the same ailments in different areas and countries indicate that the plant is of huge biological importance.

The traditional use of the plant for the treatment of dysentery has been supported by the observation that the crude extract inhibited the growth of *Shigell adysenteriae*, the causative agent ofdysentery in humans. The extract of *P. foetida* could be further explored in the future as a source of useful phytochemicals for the pharmaceutical industry.

ACKNOWLEDGMENT**:**

Authors are very much thankful to the management and staffs of the IMT Pharmacy college for providing the necessary facility and support to carry out this work.

REFERENCES:

1.Simran A, Manisha V, Satish S, Sushma A. Pharmacognostic evaluation and phytochemical studies on the roots of *Amaranthustricolor* (Linn.). *Int J PharmaSciRes* 2011; 2(9): 2332-2336.

2.Ministry of Health and Family Welfare Department and Indian System of Medicine and Homeopathy, New Delhi.*The Ayurvedic Pharmacopeia of India* 1999; Part I, (2):137-140.

3. Khare CP, CCRAS.*Indian medicinal plants* 2007; 459.

4. The wealth of India (1962), A dictionary of Indian rawmaterials and industrial product, raw material, vol. 7 CSIR, New Delhi.

5.Kumar V, Yadav PKS, Singh UP, Bhat HR, Kamuruz ZMD.Pharmacognostical and phytochemical study on the leaves of *Paederiafoetida*.*Int J Pharmtech Res* 2009; 1(3):918-920.

6.Shetti S, Chellappan D K, Sharma IP, Kalusalingam A. Pharmacognostical Profile of *PaederiaFoetida* Linn. Leaves.*Int J PharmaSci Res* 2012; 3(7): 2075-2081.

7.Inouye H, Inouye S, Shimokawa N, Okigawa M, Studies on monoterpeneglucosides. VII. Iridoidglucosides of *P.scandens*.*ChemPharma Bull* 1969; 17: 1942–1948.

8.Ahmad MU, Islam MR, Huo E, Khan MW, Gupta S. Chemical constituents from *Paederiafoetida*. *JBangladesh AcadSci*1991; 15(1): 19-22.

9. Ghani A. Medicinal Plants of Bangladesh.Chemical constituents and uses. 2nd edn.,*Asiatic Society ofBangladesh*, Dhaka, Bangladesh 2003; 331-332.

10. Shrreedhara C S, Udupa N, Shetty S. Quantification of Phytoconstituents of the leaves of *Paederiafoetida* by HPTLC. *Int symposium for high performance thin layerchromatography HPTLC* 2011; p10u- 230.

11. Ghani A. Medicinal plants of Bangladesh. Chemical constituents and uses, 2nd edn.,*Asiatic society ofBangladesh*, Dhaka, Bangladesh 1998.

12.Thirupathi M, Srinivas D, Rajendar K, Raju D. Jaganmohan RK. Phytochemical Screening of *PaederiaFoetida*a rare medicinal plant - a review. *J Atoms Mole* 2013; 3(1):17-22.

13.Uddin B, Nahar T, Ahmed B M, Hossan T, Choudhury M.S.K, Hossain S. Ameliorative effects of *Paederiafoetida*Linn. (Rubiaceae) extract on hepatotoxin-inducedliver damage.*Bangladesh J Life Sci* 2010; 22(2): 57-63.

14.De S, Shukla VJ.A preliminary study on the hepatoprotective activity of methanol extract of *Paederiafoetida*leaf.Fitoterapia 1996; 67(2): 106-109.

15.Pal MK. Evaluation of Anthelmintic activity of leaves of *PaederiaFoetida.Int J PharmaBiosci*2011; 2(1): 227-231.

16.Uddin B, Nahar T, Khalil M. Ibrahim and Hossain S.*Invitro* antibacterial activity of the ethanol extract of*Paederiafoetida*L. (Rubiaceae) leaves. *Bangladesh J Life Sci*2007; 19(2): 141-143.

17.Srivastava MC, Tewari JP, Kant.Anti-inflammatory activity of an indigenous plant-*Paederiafoetida* (Gandhali).*Indian J of Med Sci* 1973; 27(3): 231-234.

18.Srinivasreddy K, Kumar SA, Ganapathy S. Evaluation of anti-ulcer activity of *Paederiafoetida* root extracts in experimentally induced gastric ulcer in rats. *Int J Res AyurPharm* 2011; 2(5): 1556-1559.

19.Whittle B.A. The use of changes in capillary permeability in mice to distinguish between narcotic and non-narcotic analgesics.*Br J PharmacolChemother* 1964; 22: 246-253.

20.Hossain Md. Murad, Ali MS, Saha A, Alimuzzaman Md. Antinociceptive Activity of Whole Plant Extracts of *Paederia*foetida. *Dhaka Univ J Pharm Sci*2006; 5(1-2):67-69.

21.Srianta I, Arisasmita JH, Patria, HD, Epriliati I. Ethnobotany, nutritional composition and DPPH radical scavenging of leafy vegetables of wild *Paederiafoetida* and *Erechtiteshieracifolia*. *Int Food Res J* 2012; 19 (1): 245-250.

Received: November 12th , 2018, Revised: November 15th , 2018, Accepted: November 17th , 2018,

Licensee Abhipublications Open.

Corresponding Author: ***Nigam Jyoti Maiti***
IMT Pharmacy College, Gopalpur, Puri. E mail ID: nigammaiti007@gmail.com